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(54) Title of the Invention: Electric vacuum

20 cleaner

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SPECIFICATION

1. Title of the Invention

Electric vacuum cleaner

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2. Scope of the Patent Claims

(1) Electric vacuum cleaner characterized in that it comprises a rotatable drum-type filter which covers the outer peripheral surface of a main body which houses an electric blower, an air intake port and an air discharge port which are in contact with the inner wall surface of said filter and which are provided so as to link with the abovementioned electric blower, temporary dust collection parts which are formed by a roller at the outer peripheral surface and side surface of the abovementioned filter and a plurality of ribs, and a detachable dust collection bag positioned opposite the abovementioned air discharge port, with the temporary dust collection parts interposed.

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(2) Electric vacuum cleaner according to Claim 1, in which the area of the air discharge port is set to be smaller than the area of the air intake port.

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(3) Electric vacuum cleaner according to Claim 1, in which elastic bodies are used as the plurality of ribs which form the temporary dust collection parts.

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(4) Electric vacuum cleaner according to Claim 1, in which the plurality of ribs formed by the elastic bodies are inclined in the direction of rotation of the filter.

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(5) Electric vacuum cleaner according to Claim 1, in which the tip end of the plurality of ribs project in a hook shape in the direction of rotation of the filter.

(6) Electric vacuum cleaner according to Claim 1, in which the opening part of the dust collection bag is

provided so as to correspond to the interval between the ribs of the temporary dust collection parts.

3. Detailed Description of the Invention

5 Field of Industrial Application

The present invention relates to an electric vacuum cleaner which houses an electric blower.

10 Example of Prior Art Configuration and Associated Problems

Conventional electric vacuum cleaners are provided with a filter on the air intake side of the electric blower of clean-fan-type for capturing dust, and they are provided with a filter on the air discharge side of the 15 electric blower of the dirty-fan-type for capturing dust. With these filters, in the case of the clean-fan-type, because of the structure whereby the airflow is concentrated at the electric blower, blockages are likely to occur even if the filter has a large area; 20 furthermore, in the case of the dirty-fan-type, because of the structure whereby the airflow is diffuse, blockages are unlikely to occur if the filter has a large area.

25 However, in the case of the dirty-fan-type, dust passes through inside the fan, and therefore there are problems in that noise is increased and furthermore the fan is easily broken.

30 Purpose of the Invention

The present invention aims to resolve the problems described above, and also to provide an electric vacuum cleaner which temporarily captures dust, by means of an electric blower, in temporary dust collection parts 35 when they match with an air intake port, and which takes dust from the temporary dust collection parts when they match with an air discharge port to a dust collection bag; the filter does not become readily blocked, and the dust suction action is excellent.

#### Configuration of the Invention

In order to achieve the aim described above aim, the present invention consists of an electric vacuum cleaner which comprises a rotatable drum-type filter which covers the outer peripheral surface of a main body which houses an electric blower, an air intake port and an air discharge port which are in contact with the inner wall surface of said filter and which are provided so as to link with the abovementioned electric blower, temporary dust collection parts which are formed by a roller at the outer peripheral surface and the side surface of the abovementioned filter and a plurality of ribs, and a detachable dust collection bag positioned opposite the abovementioned air discharge port, with the temporary dust collection parts interposed.

The main body comprising an electric blower is inside the rotatable drum-type filter, and dust temporarily adheres to the filter in the temporary dust collection parts due to the suction force of the electric blower, after which dust which has adhered to the filter is blown off by the discharge air of the electric blower and captured in the dust collection bag, the filter does not become readily blocked, and cleaning can be performed effectively.

#### Description of the Exemplary Embodiment

An exemplary embodiment of the present invention will be described below with reference to the appended figures.

In Figures 1 to 5, 1 is an electric vacuum cleaner main body; it houses an electric blower 2 and a rechargeable-type dry cell 3, and covers a central air-circulation channel 4 and the outer peripheral surface thereof, and is provided with a drum-type filter 5 which is rotatably supported.

The central air-circulation channel 4 comprises an air intake port 6 which links with the air intake side at the bottom of the electric blower 2, and an air discharge port 7 is formed in the upper part at the front. 8 is a lateral bearing member to which the filter 5 is fixed; provision is made for an elastic, annular roller 9 on the side surface of said lateral bearing member 8 and for elastic ribs 10 which form equally-spaced partitions on said roller 9 and furthermore which form a close attachment between the lateral roller and the abovementioned filter 5. 11 is a hook formed at the tip end of the ribs 10. The filter 5 is rotatably supported due to the fact that it is attached to a shaft part 12 formed on the lateral ends of the central air-circulation channel 4 via the lateral bearing member 8.

13 are air intake ribs which form a suction port 14 which is linked to the air intake port 6, and they are in contact with the inner wall of the abovementioned filter 5. 15 are air discharge ribs which form an exhaust port 16, and they link to the air discharge port 7. The tip ends thereof are in contact with the inner wall of the filter 5 in the same way as for the abovementioned air intake ribs 13. 17 is a handle which is fixed to the shaft part 12 of the central air-circulation channel 4, and a grip 19 on which is mounted a switch 18 is fixed to its upper end.

30  
20 is a lead wire which is connected to the switch 18 and runs through the inside of the handle 17 from a lead wire channel 21 provided at the top part of the central air-circulation channel 4 to the shaft part. 22  
35 is a cover which is fixed to the handle, and it comprises an upper member 22a and a side member 22b.

23 is a non-metallic seal which is attached to the inner wall of the upper member of the cover 22, and it

- provides an airtight seal between the roller 9 and the ribs 10 of the filter 5, and the upper member of the cover 22. 24 is a dust collection bag insertion frame which is formed integrally with the tip end of the 5 cover 22; the dust collection bag 25 is fixed to the main body 1 by the lateral insertion of a collar 26 of the dust collection bag 25 into said frame. 27 is a stopper, and 28 is an opening part of the collar.
- 10 29 is an electrical socket; a power cable (not depicted) for recharging can be detachably connected thereto, and it is connected to the rechargeable-type dry cell 3.
- 15 30 are temporary dust collection parts which are formed by the ribs 10 which are adjacent to the outer peripheral surface of the filter 5. 31 represents dust. The filter 5 comprises widths corresponding to the suction port 14 which links to the air intake port 6 of 20 the electric blower 2, and furthermore said filter is partitioned by means of the ribs 10 so that the partitioned parts can also correspond to the air discharge port 16.
- 25 In the configuration described above, when the electric blower 2 is running, aspirated air passes between the ribs 10, and dust is filtered by means of the filter 5, after which the air passes from the suction port 14 through the air intake port 6 and reaches the electric 30 blower 2. The discharged air from the electric blower 2 passes through the exhaust port 16 from the air discharge port 7, and once again passes through the filter 5 to be discharged inside the dust collection bag 25. Then, it passes through the dust collection bag 35 25 to be discharged to the exterior.

As shown in Figure 5, when dust on the surface which is being cleaned is held in the temporary dust collection parts 30 formed by the roller 9, ribs 10 and filter 5,

by means of the suction force of the electric blower 2, and the main body 1 is pushed forwards in this state, the filter 5 rotates in the direction of the arrow A and the dust 31 which has collected in the temporary 5 dust collection parts 30 is scooped up by means of the ribs 10. In addition, when the filter 5 rotates and the temporary dust collection parts 30 arrive at the position of the exhaust port 16, the dust 31 which has collected in the temporary dust collection parts 30, 10 including fine dust which has adhered to the filter 5, is blown out from the temporary dust collection parts 30 by means of the discharged air which is discharged through the filter 5. At this time, the passage of the discharged air is controlled by means of the upper 15 member and side member of the cover 22, the non-metallic seal 23, the roller 9 and the ribs 10, and therefore the dust which is blown out enters from the central opening 28 of the collar 26 of the dust collection bag 25, and reaches the inside of the dust 20 collection bag 25. Then the dust is filtered by means of said dust collection bag 25, and only clean air is discharged to the exterior. In the case where there are hooks 11 provided at the tip ends of the ribs 10, dust 25 is captured more reliably in the temporary dust collection parts 30.

The operation described above is performed continuously between each of the ribs 10 because the filter 5 is caused to rotate, and the surface to be cleaned is 30 cleaned.

Here, if the area of the exhaust port 16 is made smaller than the area of the suction port 14, the speed of the discharge force through the filter 5 increases, 35 the filter 5 achieves complete filtration, and the surface of the filter is cleaned.

#### Effect of the Invention

According to the present invention, in the manner described above, cleaning is possible by the conventional action of pushing the main body, and also dust is temporarily captured in the temporary dust collection parts which are formed by the roller, ribs and filter, and dust is dispersed and transferred to the dust collection bag at the portion of the air discharge port corresponding to the opening part of the collar attached to the dust collection bag, and therefore the filter is always cleaned by the discharged air, blockages do not occur, and strong suction force can always be maintained. In addition, dust does not pass inside the fan of the electric blower, and therefore noise is reduced and the fan is not damaged. Furthermore, the discharged air disperses at the portion of the opening part of the collar, and therefore dust is blown inside the dust collection bag, and the area of the dust collection bag can be adequately used. Moreover, the discharged air disperses until the area of the dust collection bag is full, and therefore the speed of the discharged air is lowered, and the dust is not blown away by the discharged air.

Furthermore, since the electric blower lies inside the filter, the noise is also reduced.

Furthermore, in the present invention there is no need to attach a hose, extension tube or floor nozzle, and therefore there is little pressure loss due to these parts, and even with a compact-type electric blower with a rechargeable-type dry cell as the power source, virtually the same cleaning performance can be achieved as with a conventional vacuum cleaner, and the device is compact and lightweight, making it a high-performance electric vacuum cleaner.

In addition, since there are no blockages, there is no need to remove dirt and dust, and furthermore, if disposable paper bags are used as the dust collection

bags, maintenance such as disposal of dust and dirt is lessened.

Furthermore, the vacuum cleaner can be used without a  
5 hose or an extension tube, and therefore it can be used immediately at the time of cleaning, and since it can also be used with a rechargeable-type dry cell, cleaning can be performed without the tangling of the power cable.

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It should be noted that a rechargeable-type dry cell is used as the power source in this exemplary embodiment, but a normal AC power source may also be used, and it goes without saying that the effects described above  
15 can be achieved, other than what was stated for the power cable.

This exemplary embodiment has a configuration in which the filter is rotated by the manual pushing of the main body, but it also offers various excellent effects,  
20 such as the fact that there is nothing to stop it from being rotated electrically.

#### 4. Brief Description of the Figures

25 Figure 1 is an oblique view showing an exemplary embodiment of the present invention; Figures 2 and 3 are enlarged views in cross section of the main parts of the main body of same; and Figures 4 and 5 are enlarged views in cross section of the side surface of  
30 same.

1...electric vacuum cleaner main body; 2...electric blower; 5...filter; 6...air intake port; 7...air discharge port; 9...roller; 10...rib; 11...hook;  
35 25...dust collection bag; 28 opening part;  
30...temporary dust collection part

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Figure 1

Figure 2

Figure 3

Figure 4

5    Figure 5

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④ 発明の名称 電気掃除機

⑤ 特願 昭59-169561

⑥ 出願 昭59(1984)8月14日

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## 明細書

## 1. 発明の名称

電気掃除機

## 2. 特許請求の範囲

(1) 電動送風機を内蔵した本体の外周面を覆い、回動自在に設けたドラム型フィルターと、このフィルターの内壁面に当接し、前記電動送風機に連通するよう設けた吸気口及び排気口と、前記フィルターの外周面と側面のローラ及び複数のリップとで形成した暫定集塵部と、この暫定集塵部を介して前記排気口と対向する位置に着脱可能に設けた集塵袋とから成ることを特徴とする電気掃除機。

(2) 排気口の面積を吸気口の面積より小さく設定した特許請求の範囲第1項記載の電気掃除機。

(3) 暫定集塵部を形成する複数のリップとして弾性体を用いた特許請求の範囲第1項記載の電気掃除機。

(4) 弾性体で形成した複数のリップをフィル

ターの回動方向に傾斜させた特許請求の範囲第1項記載の電気掃除機。

(5) 複数のリップの先端をフィルターの回動方向にフック状に起こした特許請求の範囲第1項記載の電気掃除機。

(6) 集塵袋の開口部を暫定集塵部のリップ間の間隔と対応するよう設けた特許請求の範囲第1項記載の電気掃除機。

## 3. 発明の詳細な説明

## 産業上の利用分野

本発明は電動送風機を内蔵する電気掃除機に関するものである。

## 従来例の構成とその問題点

従来、電気掃除機においては、電動送風機の吸気側にフィルターを設けて塵埃を捕獲するクリーンファンタイプと、電動送風機の排気側にフィルターを設けて塵埃を捕獲するダーティーファンタイプがあった。この内、クリーンファンタイプの場合は、空気流が電動送風機に集中する機構のため、フィルター面積を大きく取っても目詰まりし

やすく、又、ダーティファンタイプの場合は、空気流は分散する機構なので、フィルター面積を大きくとれば目つまりはしにくい。

しかし、ダーティファンタイプの場合は、ファンの中を塵埃が通過するため、音が大きく、またファンがこわれやすいという欠点を有していた。

#### 発明の目的

本発明は上記問題点を解消すると共に電動送風機により吸気口と対応した暫定集塵部で一旦塵埃を捕獲し、排気口と対応した暫定集塵部から集塵袋へ塵埃を捕獲するようにして、フィルターの目つまりが少なく、吸塵作用の優れた電気掃除機を提供しようとするものである。

#### 発明の構成

本発明は上記目的達成のため、電動送風機を内蔵した本体の外周面を覆い、回動自在に設けたドラム型フィルターと、このフィルターの内壁面に当接し、前記電動送風機に連通するよう設けた吸気口及び排気口と、前記フィルターの外周面と側

面のローラ及び複数のリップとで形成した暫定集塵部と、この暫定集塵部を介して前記排気口と対向する位置に着脱可能に設けた集塵袋とから成る電気掃除機とした。

電動送風機を有する本体が回動自在なドラム型フィルター内にあり、電動送風機の吸引力により塵埃を一旦暫定集塵部のフィルターに付着させた後、電動送風機の排気により、フィルターに付着した塵埃を吹きとぼし、集塵袋に捕獲するもので、フィルターの目つまりが少なく、掃除を効率的に行なえるようにしたものである。

#### 実施例の説明

以下、添付図面に従って本発明の一実施例について説明する。

第1図～第5図において、1は電気掃除機本体で、電動送風機2と充電式乾電池3とを内蔵し、中心通風路4とその外周面を覆い、回動自在に軸支したドラム型フィルター5を備えている。

中心通風路4は、下方に電動送風機2の吸気側に連通する吸気口6を有し、前方上部に排気口7

を形成している。8は左右の軸受材でフィルター5が固定され、この左右の軸受材8の側面で輪状に形成された弹性を有するローラー9と、このローラー9を等間隔に区切り、且つ左右のローラーと上記フィルター5に密着した弹性体のリップ10とを備えている。11はリップ10の先端に形成されたフックである。フィルター5は左右の軸受材8を介して中心通風路4の左右端に形成された軸部12に取付けられることにより、回動自在に支持されている。

13は吸気リップで、吸気口6と連通する吸引口14を形成し、上記フィルター5の内壁に接する。15は排気リップで、排出口16を形成し、排気口7と連通する。その先端は上記吸気リップ13同様、フィルター5の内壁に接する。17はハンドルで、中心通風路4の軸部12に固定され、上端にはスイッチ18を取り付けたグリップ19が固定してある。

20はリード線で、中心通風路4の上部に設けたリード線通路21から軸部にハンドル17内を通りスイッチ18に連結される。22はハンドルに固定さ

れたカバーで、上部材22aと側部材22bからなっている。

23はパッキンで、カバー22の上部材の内壁に取付けられフィルター5のローラー9とリップ10と、カバー22の上部材とのエアータイトを行なう。24は集塵袋挿入枠で、カバー22の先端に一体に形成され、集塵袋25の口芯26を横方向より挿入することにより、集塵袋25を本体1に固定する。27はストッパー、28は口芯の閉口部である。

29はコンセントで、充電用の電源コード(図示せず)を着脱自在に接続でき充電式乾電池3に接続される。

30は暫定集塵部で、フィルター5の外周面と隣接するリップ10により形成されている。31は塵埃を示す。フィルター5は電動送風機2の吸気口6と連通する吸引口14と対応した幅を有し、又排気口16とも対応できるようリップ10により区別られている。

上記構成において、電動送風機2を運転すると、吸引空気はリップ10の間を通り、フィルター

5により塵埃をろ過された後、吸引口14から吸気口6を通り、電動送風機2に至る。電動送風機2の排気は排気口7から排出口16を経て、再度フィルター5を通過して集塵袋25内に排出される。そして、集塵袋25を通過して外部へ排出される。

第5段に示すように、被掃除面の塵埃は、電動送風機2の吸引力により一旦、ローラー9とリップ10と、フィルター5より形成される暫定集塵部30に貯められ、この状態で本体1を前方に押すと、フィルター5が矢印A方向に回動し、暫定集塵部30にたまつた塵埃31はリップ10によりすくい上げられる。さらに、フィルター5を回動させ、暫定集塵部30が排出口16の位置にきたとき、暫定集塵部30にたまつた塵埃31はフィルター5を通過して排出される排気により、フィルター5に付着した細塵も含めて、暫定集塵部30より吹き出される。この際、カバー22上部材と側部及びバッキン23とローラー9、リップ10により、排気通路が抑えられているため、吹き出された塵埃は、集塵袋25の口芯26の開口部28から入り込み、集塵袋25内

に至る。そしてこの集塵袋25により塵埃がろ過され、清浄空気のみが外部へ排出される。リップ10の先端にフック11を設けた場合、暫定集塵部30での塵埃捕獲がより確実となる。

上記の動作がフィルター5を回動させることにより、各リップ10間ににおいて連続的に行なわれ、被掃除面の掃除を行なう。

ここで排出口16の面積は吸引口14の面積より小さくしておくと、フィルター5の通過速度は排気の方が速くなり、フィルター5によるろ過が完全になり、フィルター面が清掃される。

#### 発明の効果

上記のように本発明によれば本体を押すという従来の操作により、掃除ができるとともに、ローラー、リップ及びフィルターにより形成される暫定集塵部に一旦塵埃を捕獲し、集塵袋を取付けた口芯の開口部と対応する排気口の部分で塵埃を集塵袋へ分散して移行させてるので、フィルターが常に排気により清掃され、目づまりがなく、常に強い吸引力を保持できるようになった。さらに、

電動送風機のファン内を塵埃が通らないので、音も小さく、ファンが壊れることもない。又、口芯の開口部で気流が分散するので集塵袋内に塵埃を吹き込むことになり、集塵袋の面積を充分利用できる。しかも排気が集塵袋の面積一杯まで分散するので、排気速度が小さくなり、排気により塵埃吹き飛ばしもなくなる。

また電動送風機がフィルター内に入っているため騒音も低減される。

又、本発明においては、ホース、延長管、床ノズルをつける必要がないので、これらの部分による圧損が少なく、充電式乾電池を電源とした小型の電動送風機でも、従来の掃除機とほぼ同等の清掃能力が得られ、小型軽量で高性能の電気掃除機を得ることができる。

さらに目づまりがないので、ちり落としの必要がなく、また集塵袋として使い捨てのできる紙袋を使用すればゴミ捨て等のメンテナンスも非常に楽になる。

またホース、延長管なしで使えるので、掃除の

際すぐに使用でき、充電式乾電池でも使用できるので電源コードをひきずりまわすことなく掃除することができる。

尚、電源として実施例では充電式乾電池を使用したが、通常のAC電源を使用してもよく、電源コード以外の上記効果が得られることは言うまでもない。

本実施例ではフィルターを手動で本体を押して回す構成にしたが電動で回しても何等支障はない等種々の優れた効果を有する。

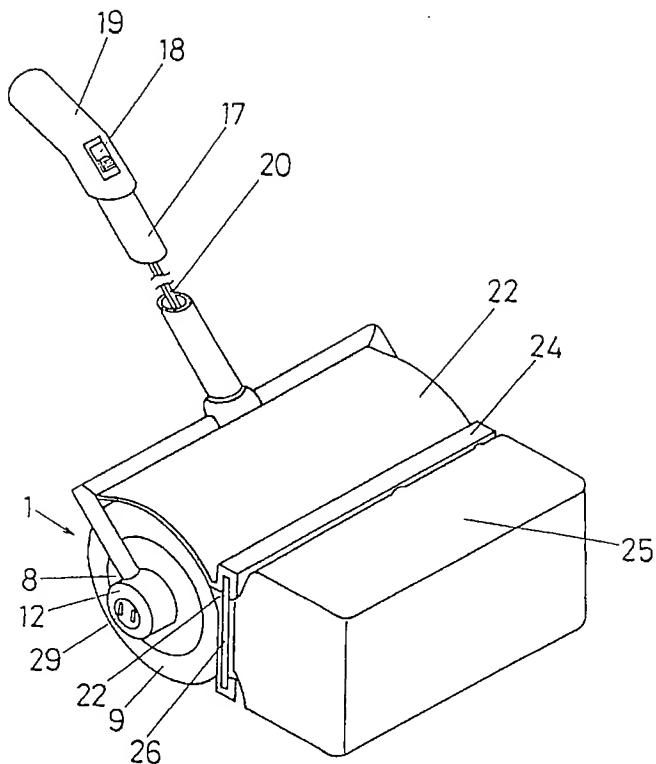
#### 4. 図面の簡単な説明

第1図は本発明の実施例を示す斜視図、第2図及び第3図は同本体の要部拡大断面図、第4図及び第5図は同側面拡大断面図である。

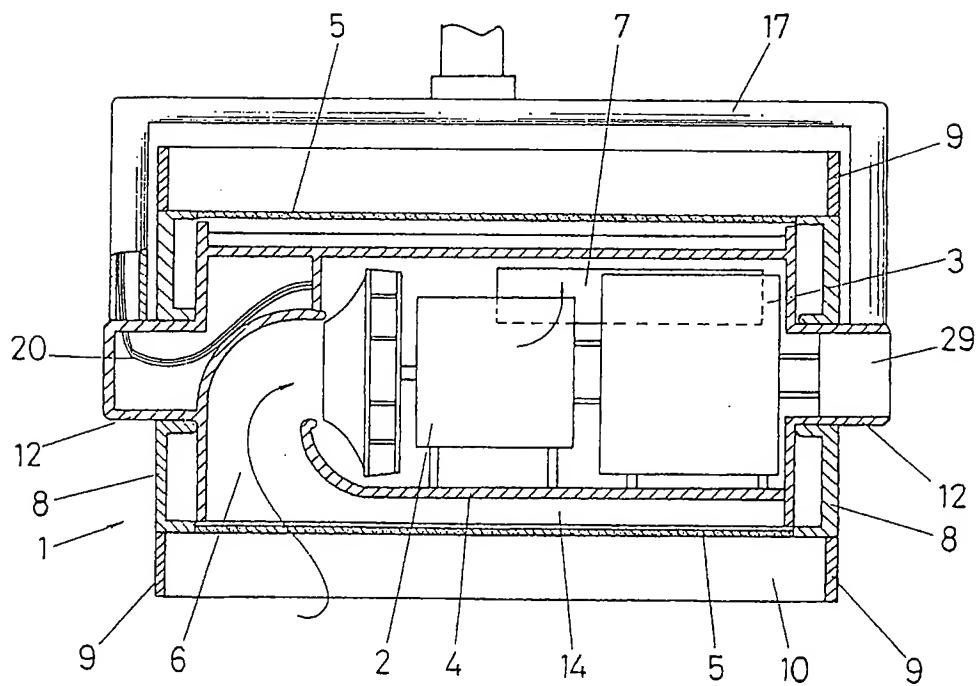
1…電気掃除機の本体	2…電動送風機	
5…フィルター	6…吸気口	7…排気口
9…ローラー	10…リップ	11…フック
25…集塵袋	28…開口部	30…暫定集塵部

代理人弁理士大島一公

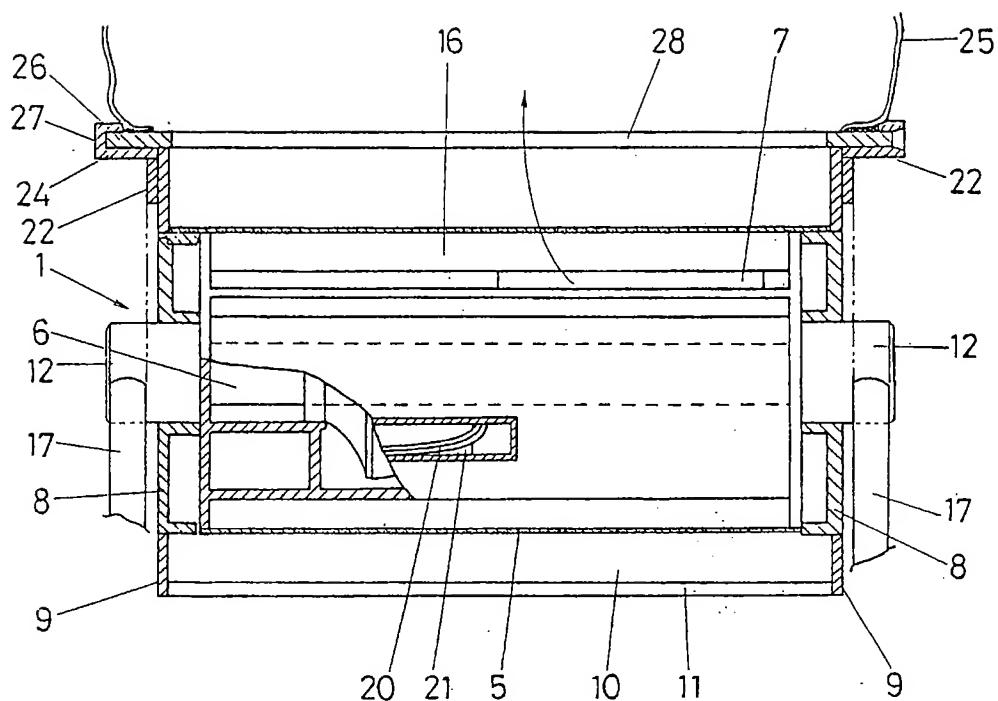
第1図



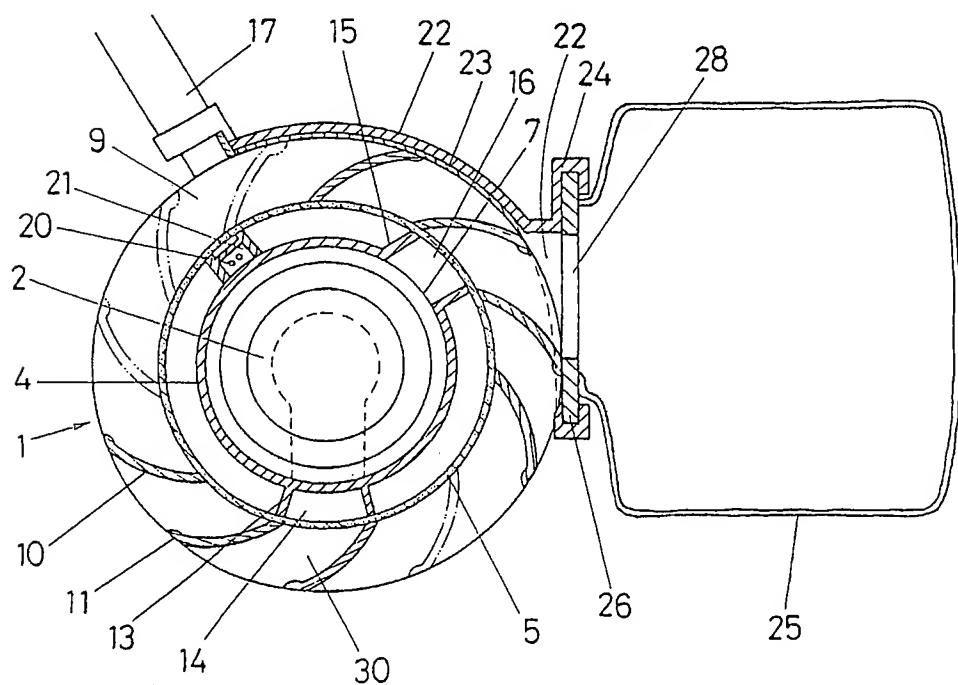
第2図



第3図



第4図



第5図

